Ordering number : EN8054A

2SK3816

N-Channel Power MOSFET
60V, 40A, 26mΩ, TO-262-3L/TO-263-2L

ON Semiconductor®
http://onsemi.com

Features

- ON-resistance $R_{DS}(on)1$=20mΩ(typ.)
- Input capacitance Ciss=1780pF(typ.)
- 4V drive

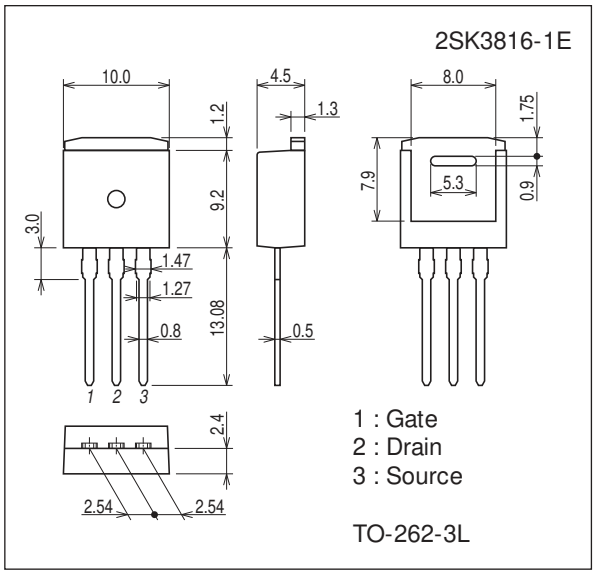
Specifications

Absolute Maximum Ratings at Ta=25°C

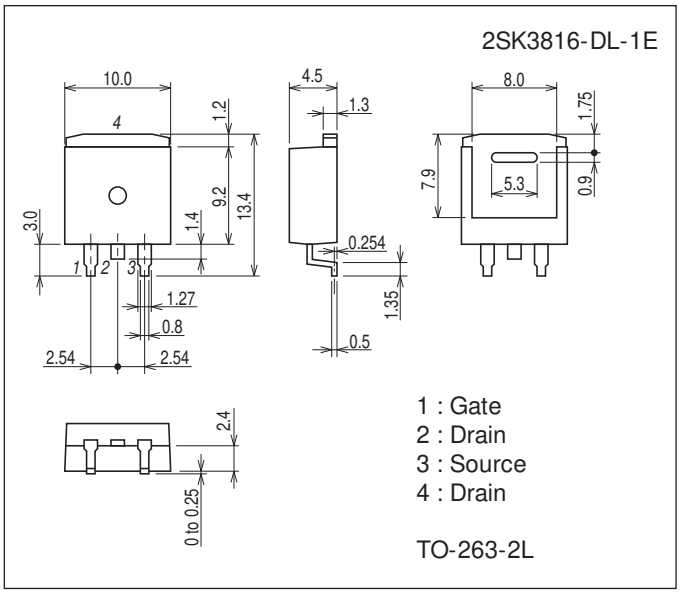
Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		60	V
Gate to Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		40	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	160	A
Allowable Power Dissipation	P_D		1.65	W
		Tc=25°C	50	W

Continued on next page.

Package Dimensions unit : mm (typ)
7537-001



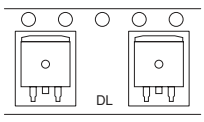
Package Dimensions unit : mm (typ)
7535-001



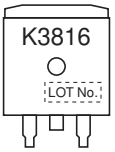
Ordering & Package Information

Device	Package	Shipping	memo
2SK3816-1E	TO-262-3L (TO-262)	50pcs./tube	Pb Free
2SK3816-DL-1E	TO-263-2L (SC-83, TO-263)	800pcs./reel	

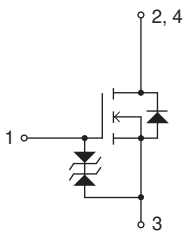
Packing Type : DL



Marking



Electrical Connection



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Parameter	Symbol	Conditions	Ratings	Unit
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		60	mJ
Avalanche Current *2	I_{AV}		40	A

Note :*1 V_{DD}=20V, L=50μH, I_{AV}=40A (Fig.1)
*2 L≤50μH, single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=20A	16	27		S
Static Drain to Source On-State Resistance	R_{DS}(on)1	I_D=20A, V_{GS}=10V		20	26	mΩ
	R_{DS}(on)2	I_D=20A, V_{GS}=4V		28	40	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		1780		pF
Output Capacitance	Coss			266		pF
Reverse Transfer Capacitance	Crss			197		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		16.5		ns
Rise Time	t_r			160		ns
Turn-OFF Delay Time	t_d(off)			160		ns
Fall Time	t_f			160		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_D=40A		40		nC
Gate to Source Charge	Qgs			6.5		nC
Gate to Drain “Miller” Charge	Qgd			11.5		nC
Diode Forward Voltage	V_{SD}	I_S=40A, V_{GS}=0V		1.05	1.5	V

Fig.1 Unclamped Inductive Switching Test Circuit

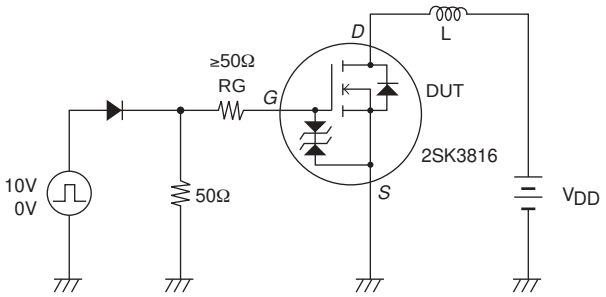
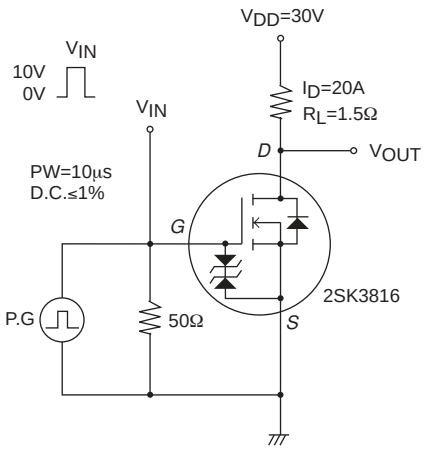
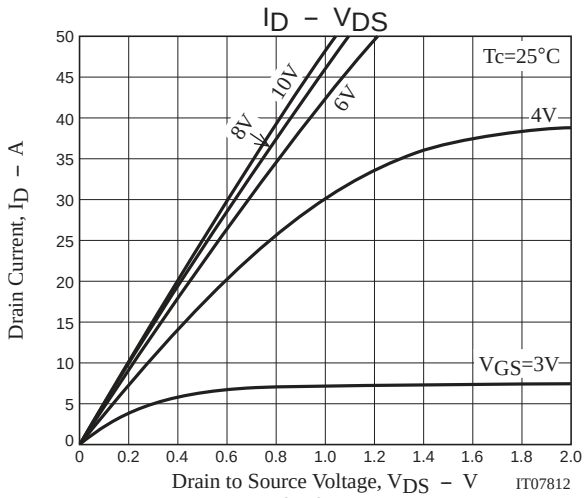
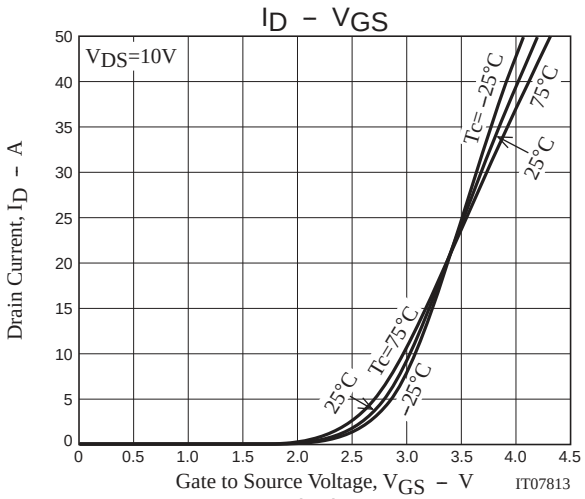
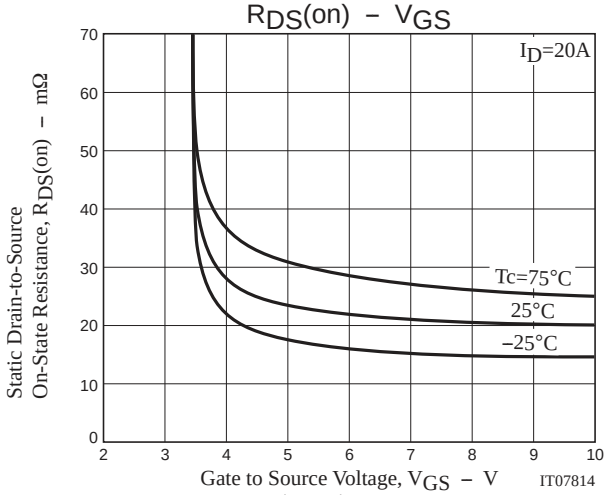


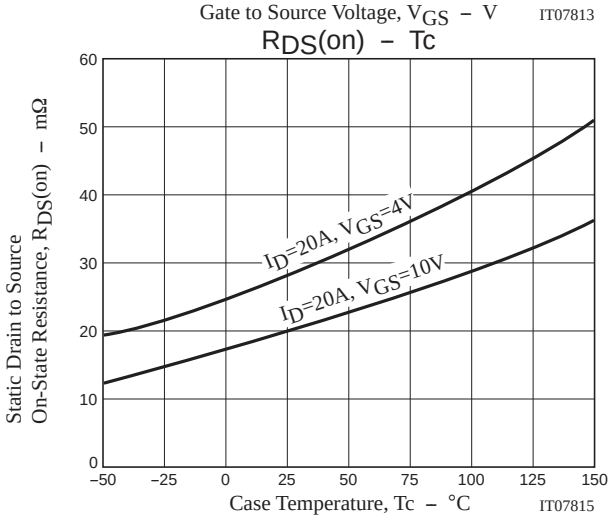
Fig.2 Switching Time Test Circuit

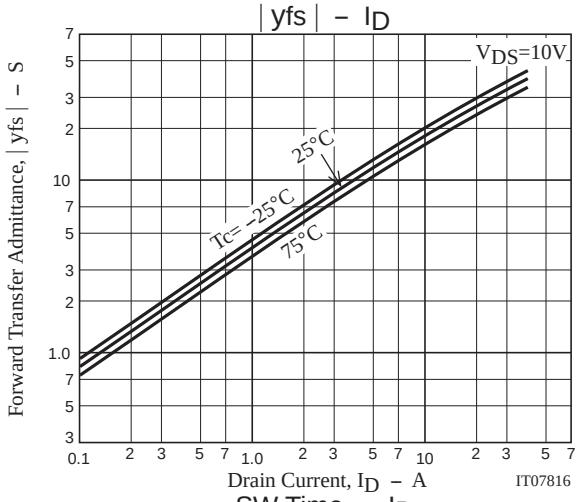


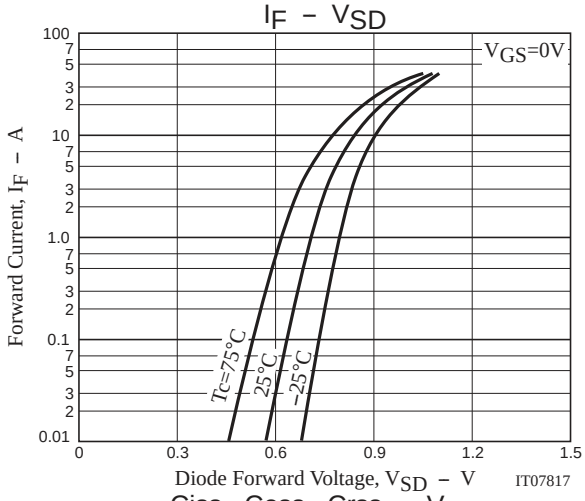

ID – VDS
Tc=25°C
8V
10V
6V
4V
VGS=3V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT07812

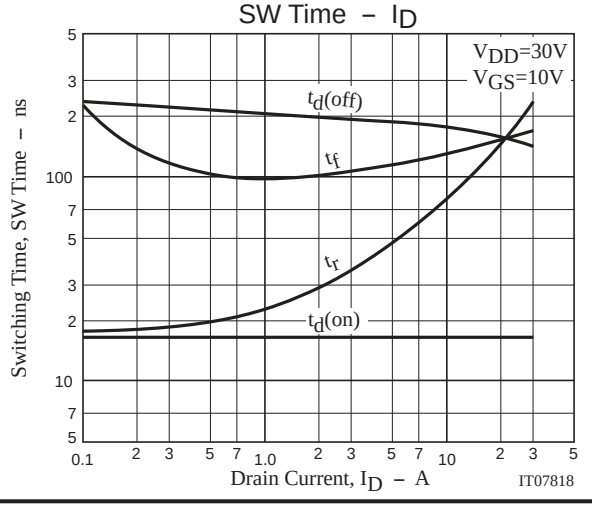

ID – VGS
VDS=10V
Tc=–25°C
75°C
25°C
Tc=75°C
25°C
–25°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT07813

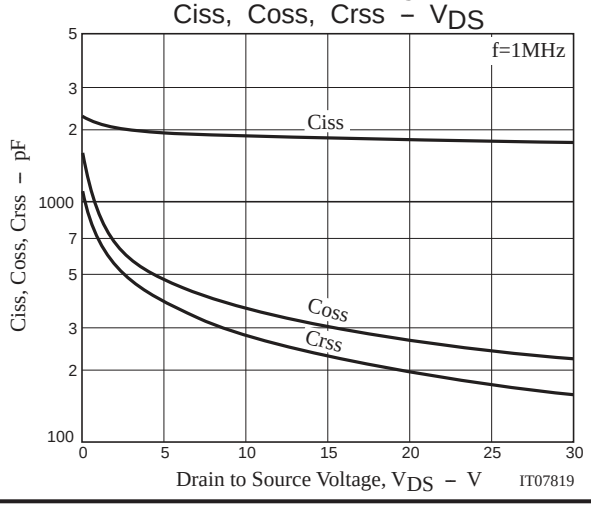

RDS(on) – VGS
ID=20A
Tc=75°C
25°C
–25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT07814

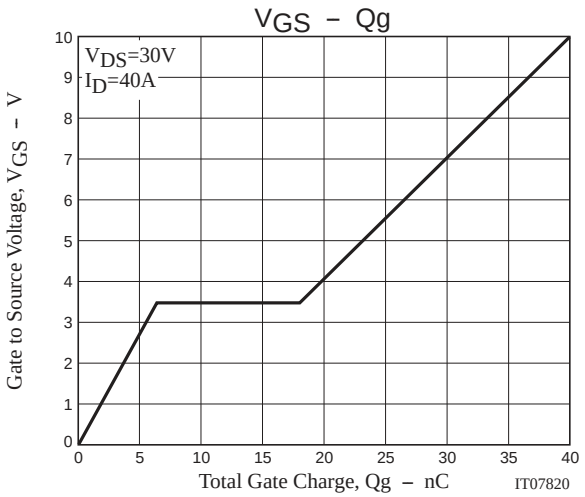

RDS(on) – Tc
ID=20A, VGS=4V
ID=20A, VGS=10V
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT07815

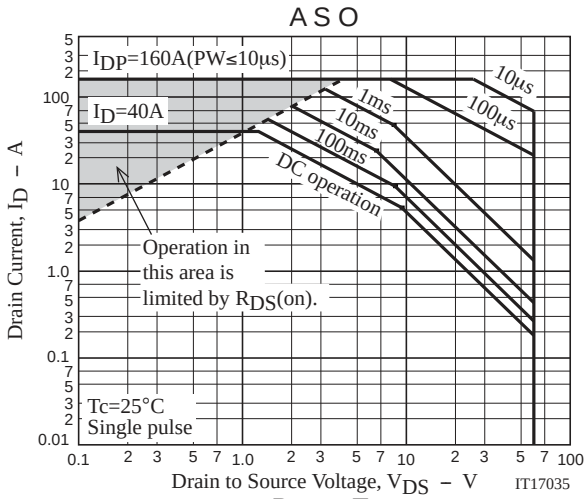

| yfs | – ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT07816

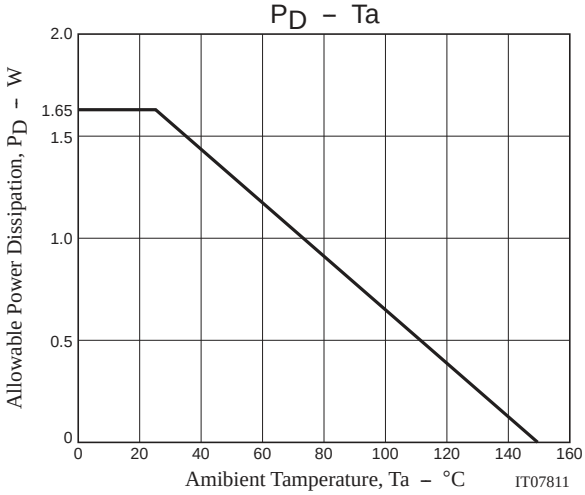

IF – VSD
VGS=0V
Tc=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT07817

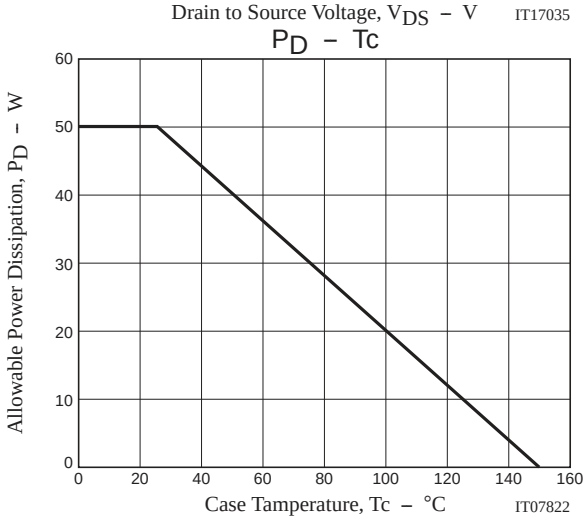

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT07818


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT07819


VGS – Qg
VDS=30V
ID=40A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT07820

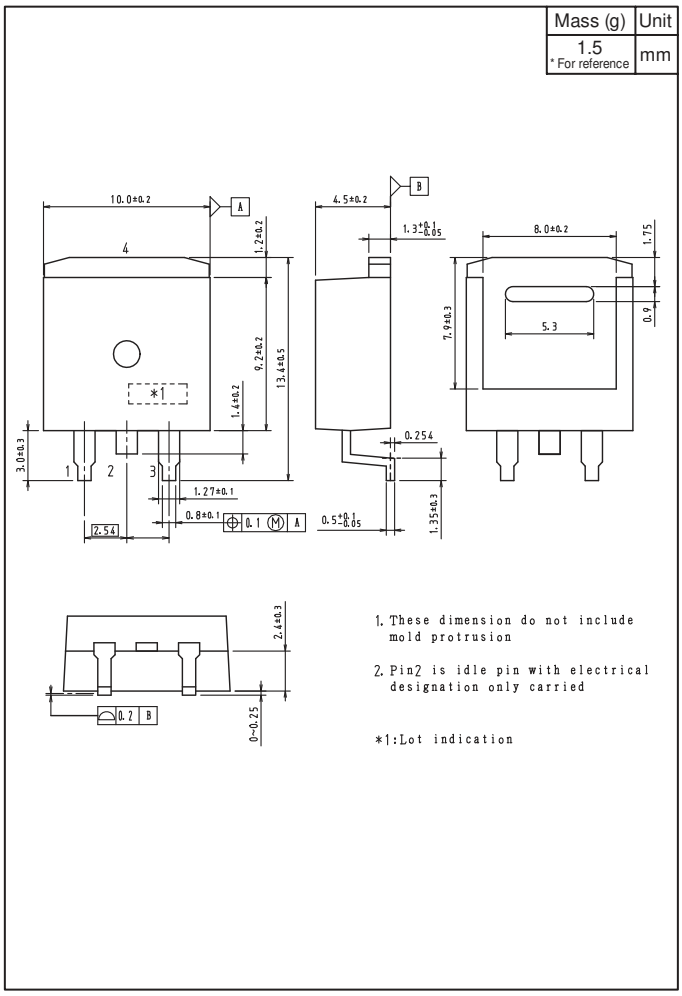

A S O
IDP=160A(PW≤10μs)
ID=40A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17035


PD – Ta
Allowable Power Dissipation, PD – W
Amibient Tamperature, Ta – °C
IT07811

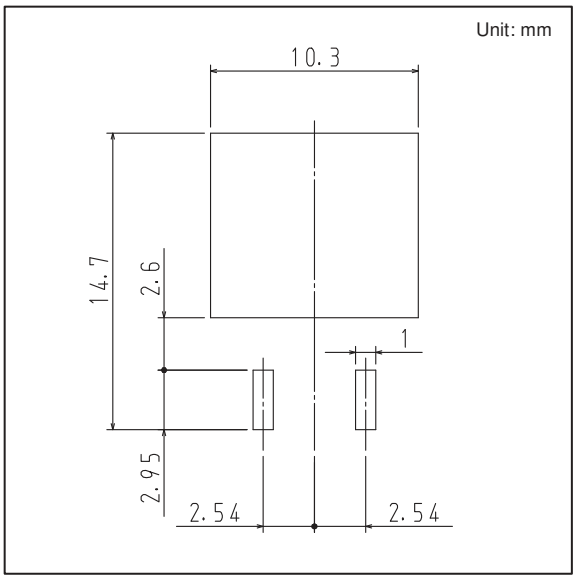

PD – Tc
Allowable Power Dissipation, PD – W
Case Tamperature, Tc – °C
IT07822

Outline Drawing

2SK3816-DL-1E

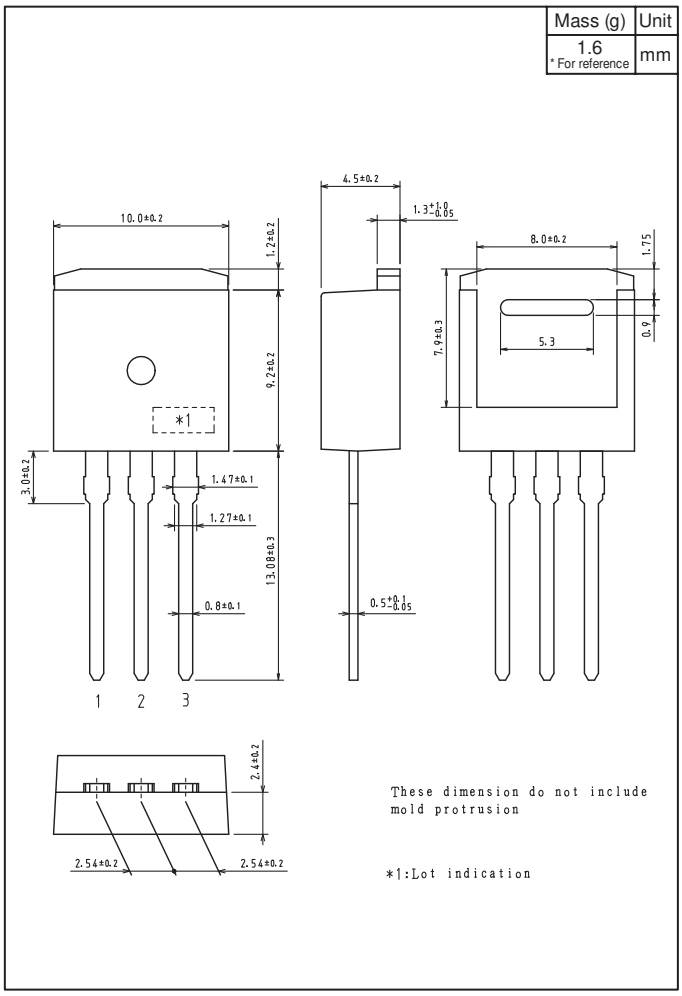


Land Pattern Example



Outline Drawing

2SK3816-1E



Note on usage : Since the 2SK3816 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.