

TO-220



ITO-220



Pin Definition:

1. Gate
2. Drain
3. Source

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)(max)	I_D (A)
600	0.75 @ $V_{GS}=10V$	10

Features

- Advanced high dense cell design.
- High Power and Current handling capability.

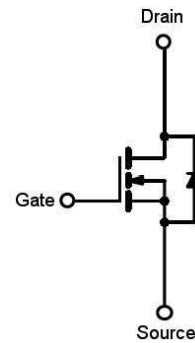
Application

- Power Supply.
- Lighting.

Ordering Information

Part No.	Package	Packing
TSM10N60CZ C0	TO-220	50pcs / Tube
TSM10N60CI C0	ITO-220	50pcs / Tube

Block Diagram



N-Channel MOSFET

Absolute Maximum Rating ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit		Unit
		TO-220	ITO-220	
Drain-Source Voltage	V_{DS}	600		V
Gate-Source Voltage	V_{GS}	± 30		V
Continuous Drain Current	I_D^a	$T_C = 25^\circ C$		A
		$T_C = 100^\circ C$		
Pulsed Drain Current ^b	I_{DM}^a	40		A
Total Power Dissipation @ $T_C=25C$	P_{DTOT}	166	50	W
Single Pulsed Avalanche Energy ^c	E_{AS}	41		mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150		$^\circ C$

Thermal Performance

Parameter	Symbol	Limit		Unit
Junction to Case Thermal Resistance	$R_{\theta JC}$	0.75	2.5	$^\circ C/W$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	63		$^\circ C/W$

Notes a: Current limited by package

Notes b: Pulse width limited by the Maximum junction temperature

Notes c: $L=0.75mH, I_{AS}=10A, V_{DD}=50V, R_G=25\Omega, \text{Starting } T_J=25^\circ C$

Specifications (Ta = 25°C unless otherwise noted)

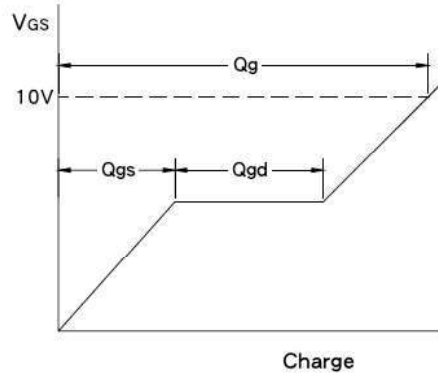
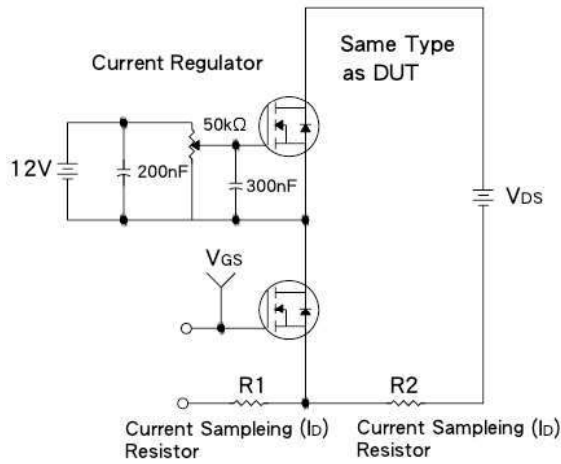
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static^a						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	600	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	2	3.1	4	V
Gate Body Leakage	$V_{GS} = \pm 30V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	I_{DSS}	--	--	20	μA
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 5A$	$R_{DS(ON)}$	--	0.61	0.75	Ω
Dynamic^b						
Total Gate Charge	$V_{DS} = 300V, I_D = 10A,$ $V_{GS} = 10V$	Q_g	--	45.8	--	nC
Gate-Source Charge		Q_{gs}	--	11.5	--	
Gate-Drain Charge		Q_{gd}	--	16	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	1738	--	pF
Output Capacitance		C_{oss}	--	195	--	
Reverse Transfer Capacitance		C_{rss}	--	26.3	--	
Switching^b						
Turn-On Delay Time	$V_{DD} = 300V, R_G = 10\Omega,$ $I_D = 10A, V_{GS} = 10V,$	$t_{d(on)}$	--	33.6	--	nS
Turn-On Rise Time		t_r	--	7.4	--	
Turn-Off Delay Time		$t_{d(off)}$	--	68	--	
Turn-Off Fall Time		t_f	--	15.2	--	
Source-Drain Diode^a						
Forward On Voltage	$I_S = 10A, V_{GS} = 0V$	VSD	--	0.8	1.5	V

Notes a: Pulse test: PW $\leq 300\mu S$, duty cycle $\leq 2\%$

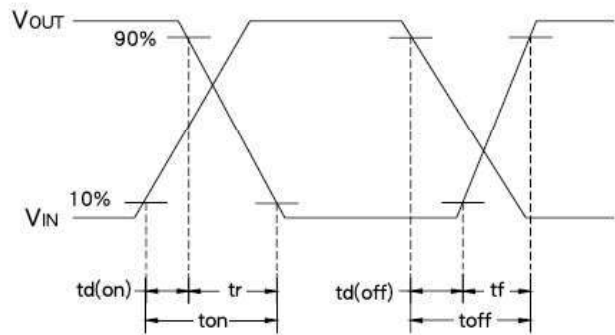
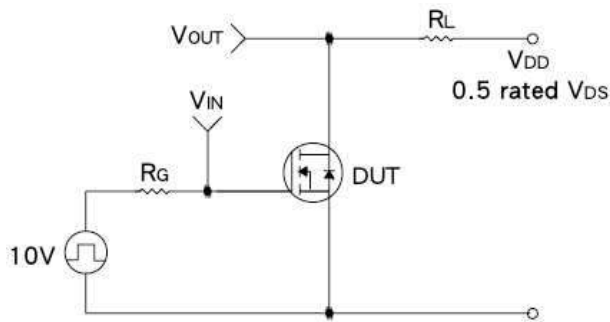
Notes b: For DESIGN AID ONLY, not subject to production testing.

Notes c: Switching time is essentially independent of operating temperature.

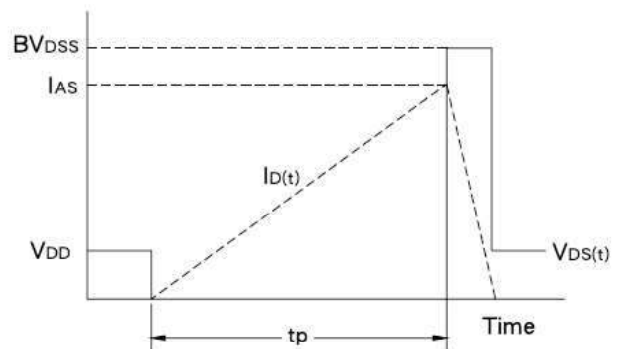
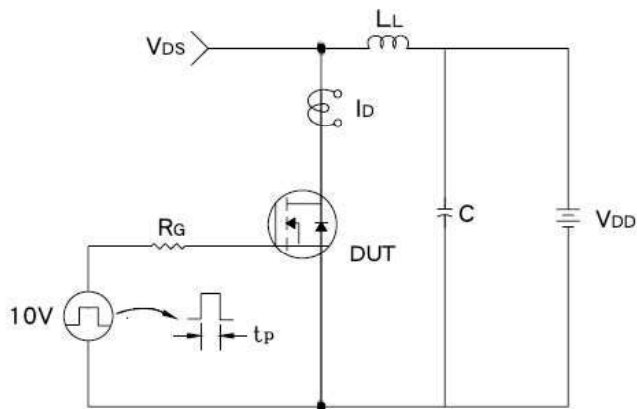
Gate Charge Test Circuit & Waveform



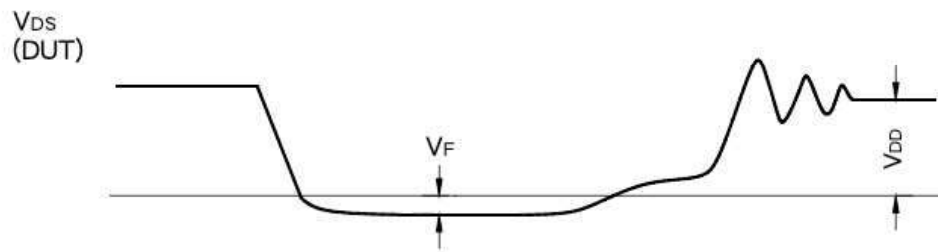
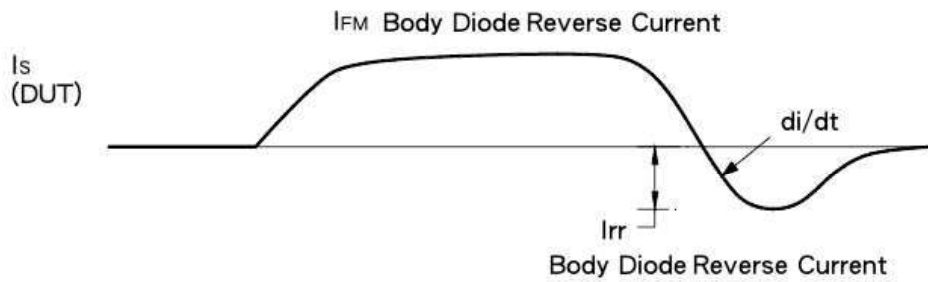
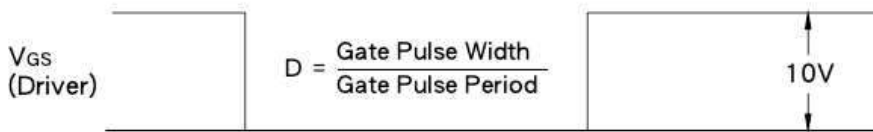
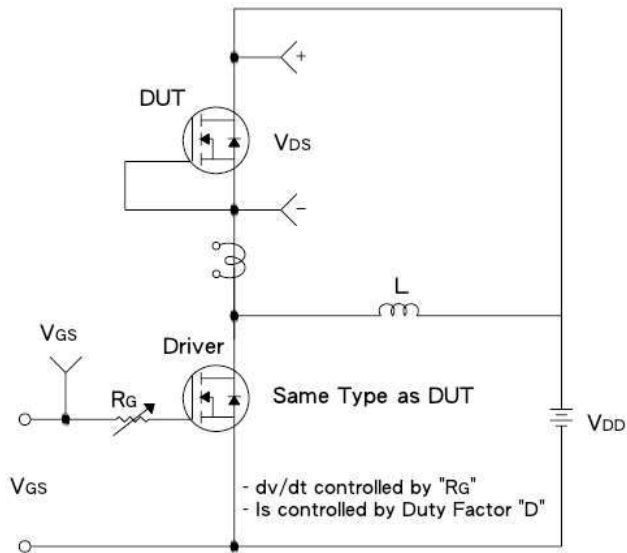
Resistive Switching Test Circuit & Waveform



EAS Test Circuit & Waveform

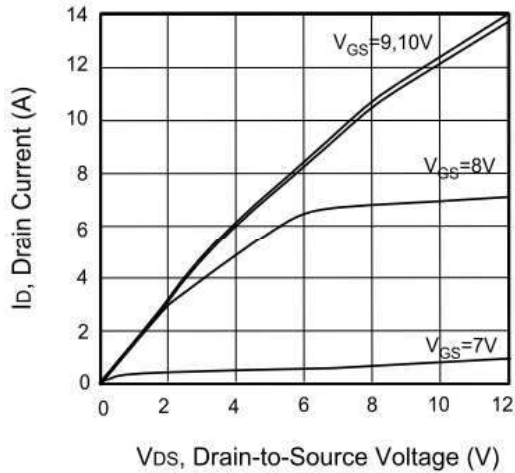


Diode Reverse Recovery Time Test Circuit & Waveform

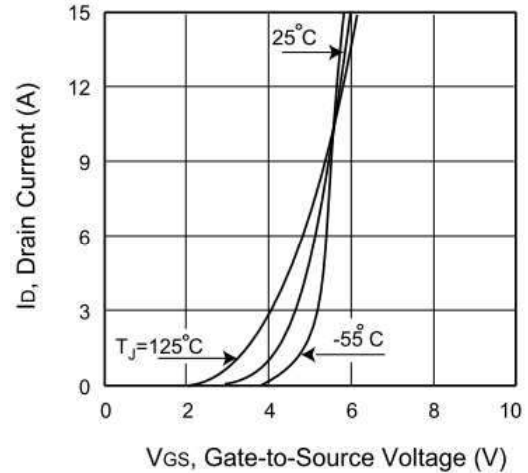


Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

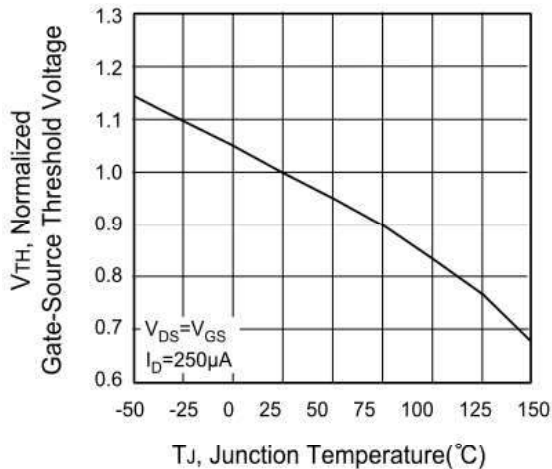
Output Characteristics



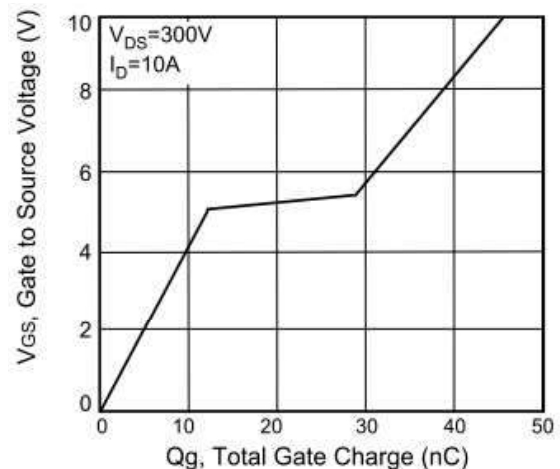
Transfer Characteristics



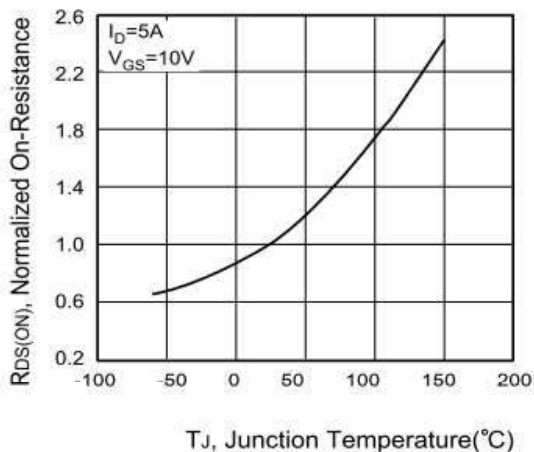
Threshold Voltage



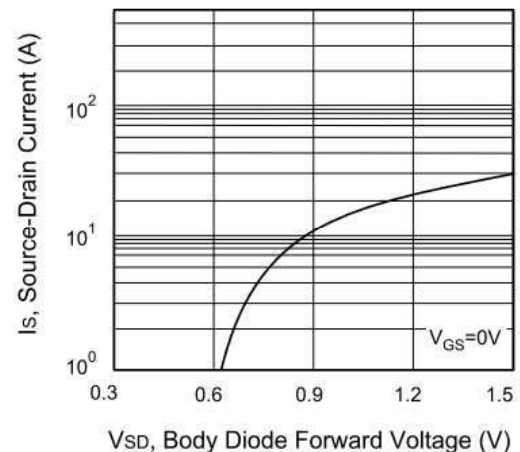
Gate Charge



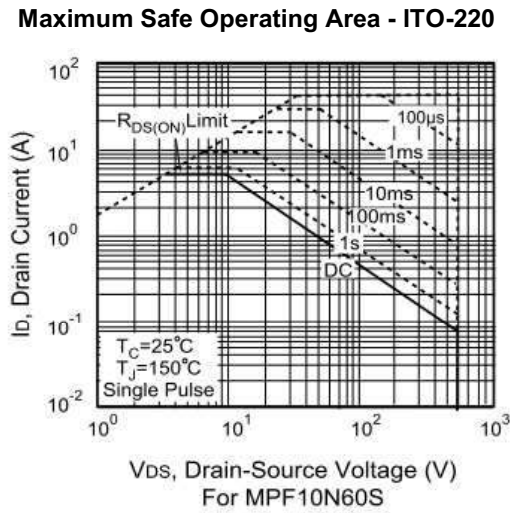
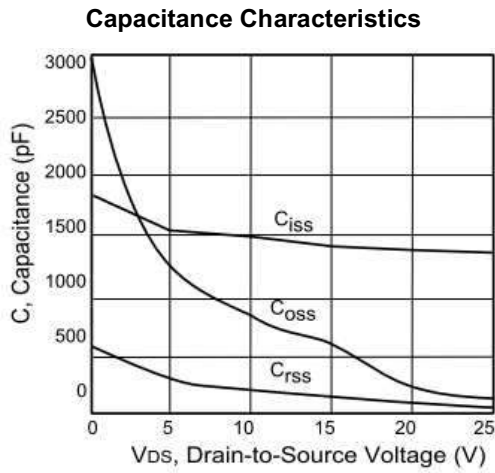
On-Resistance vs. Junction Temperature



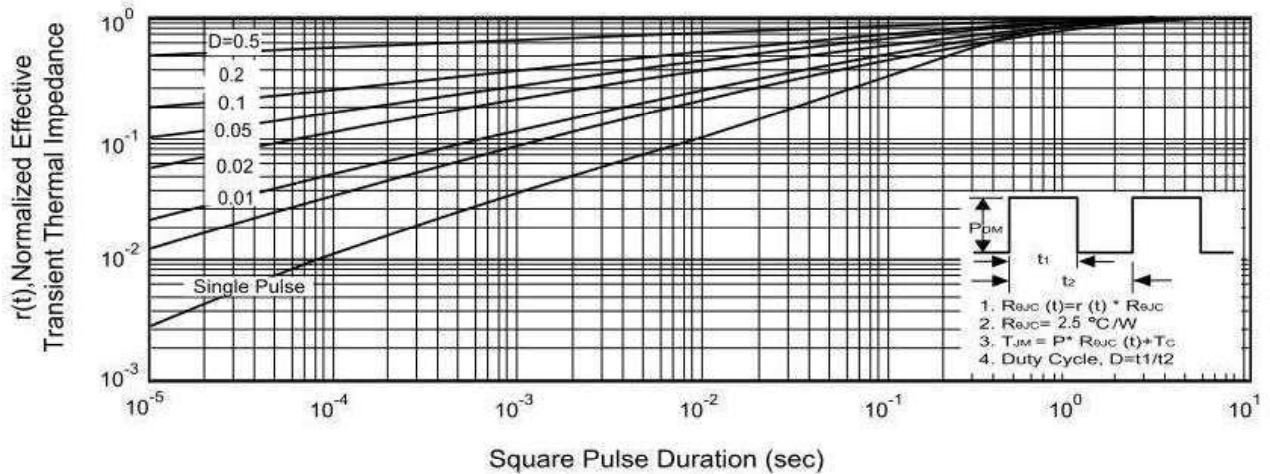
Source-Drain Diode Forward Voltage



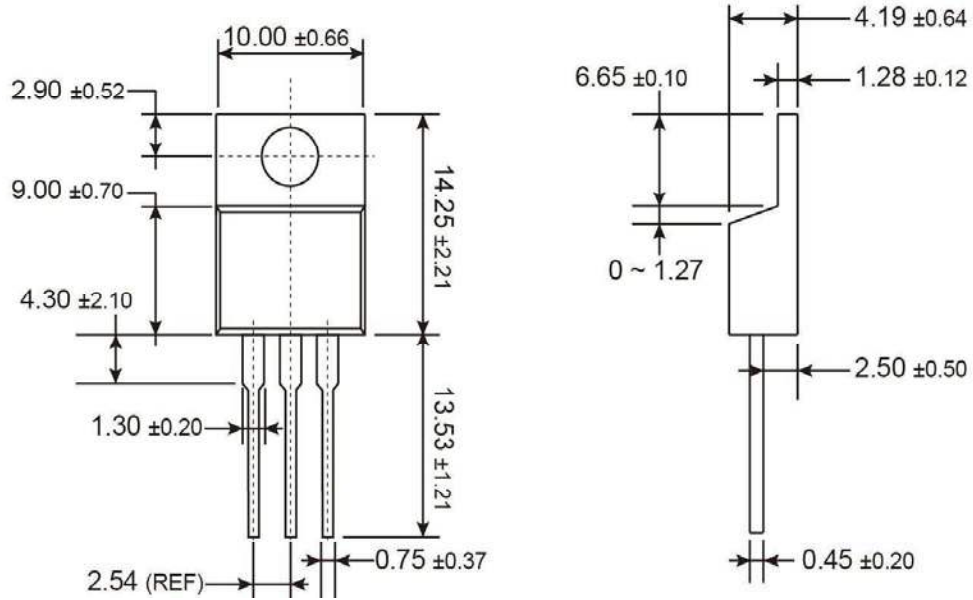
Electrical Characteristics Curve ($T_a = 25^\circ\text{C}$, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

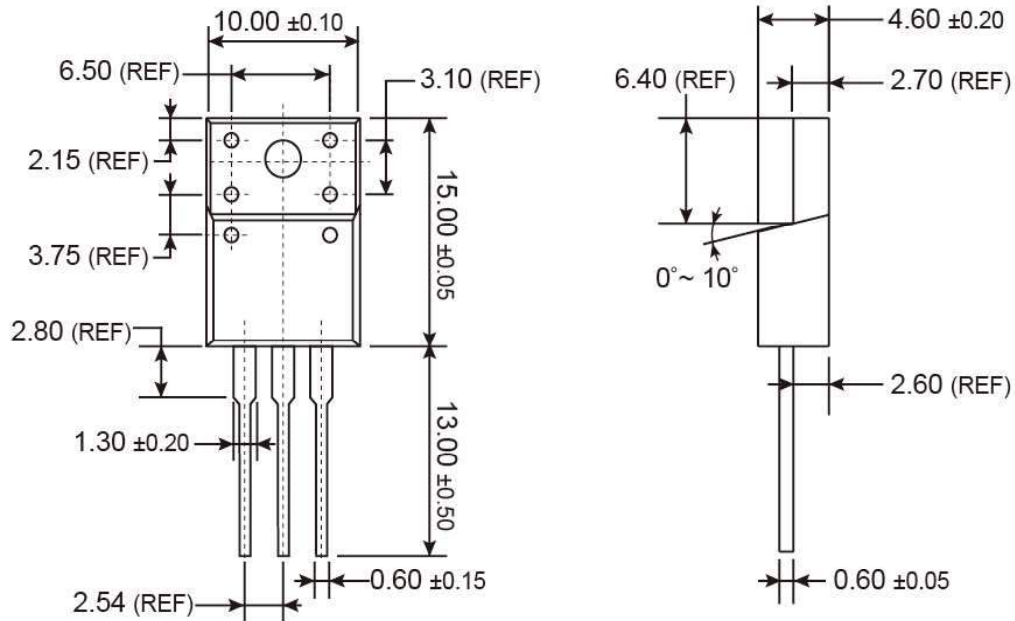


TO-220 Mechanical Drawing



Unit: Millimeters

ITO-220 Mechanical Drawing



Unit: Millimeters

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